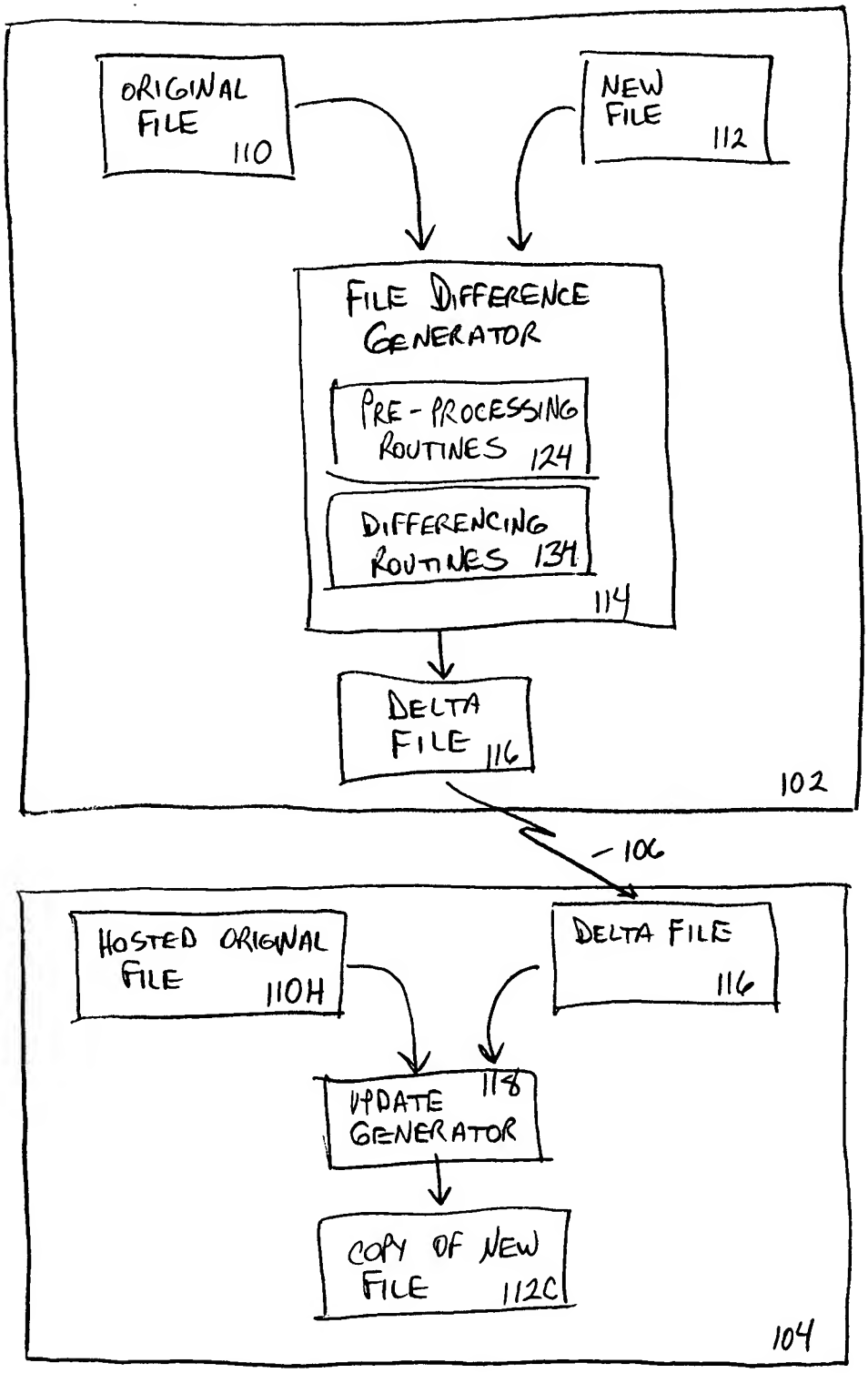
ORIGINAL FILE 110
NEW FILE 112
FILE DIFFERENCE GENERATOR
PRE-PROCESSING ROUTINES 124
DIFFERENCING ROUTINES 134
114
DELTA FILE 116
102
106
HOSTED ORIGNAL FILE 110H
DELTA FILE 116
UPDATE GENERATOR 118
COPY OF NEW FILE 112C
104

FIGURE 1

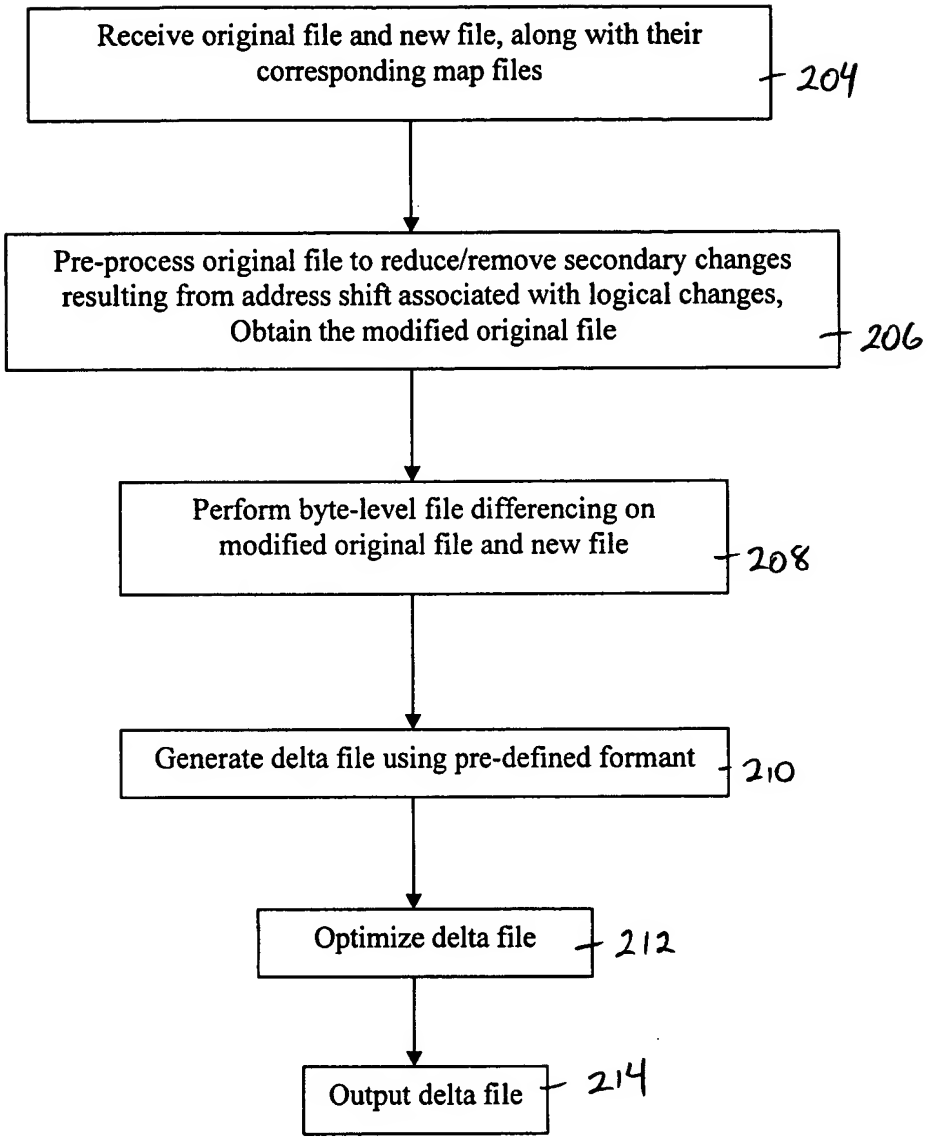
Receive original file and new file, along with their corresponding map files
204
Pre-process original file to reduce/remove secondary changes resulting from address shift associated with logical changes, Obtain the modified original file
206
Perform byte-level file differencing on modified original file and new file
208
Generate delta file using pre-defined formant
210
Optimize delta file
212
Output delta file
214

Figure 2

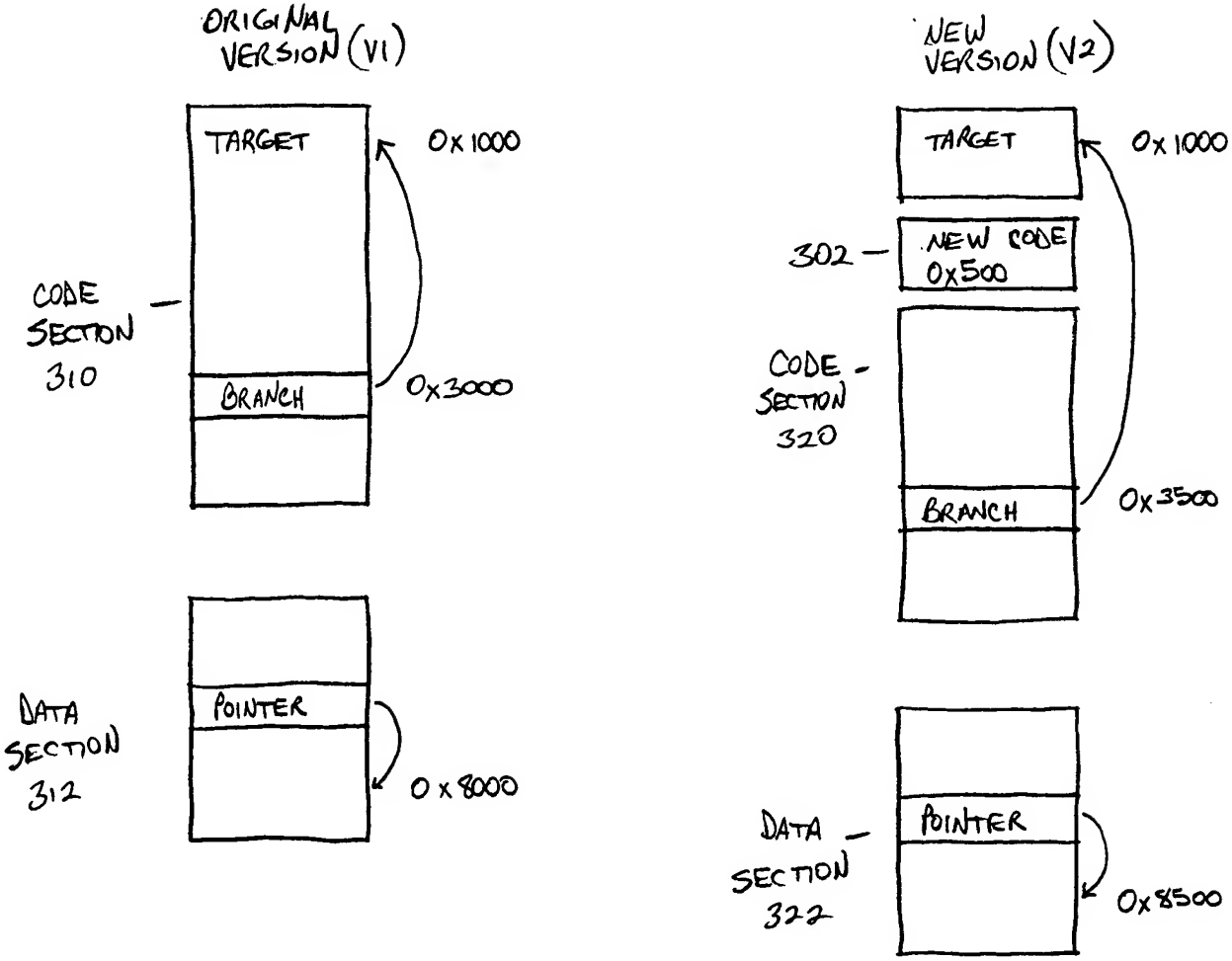
ORIGINAL VERSION (V1)
TARGET
0x1000
CODE SECTION 310
BRANCH
0x3000
DATA SECTION 312
POINTER
0x8000
NEW VERSION (V2)
TARGET
0x1000
302
NEW CODE 0x500
CODE SECTION 320
BRANCH
0x3500
DATA SECTION 322
POINTER
0x8500

FIGURE 3

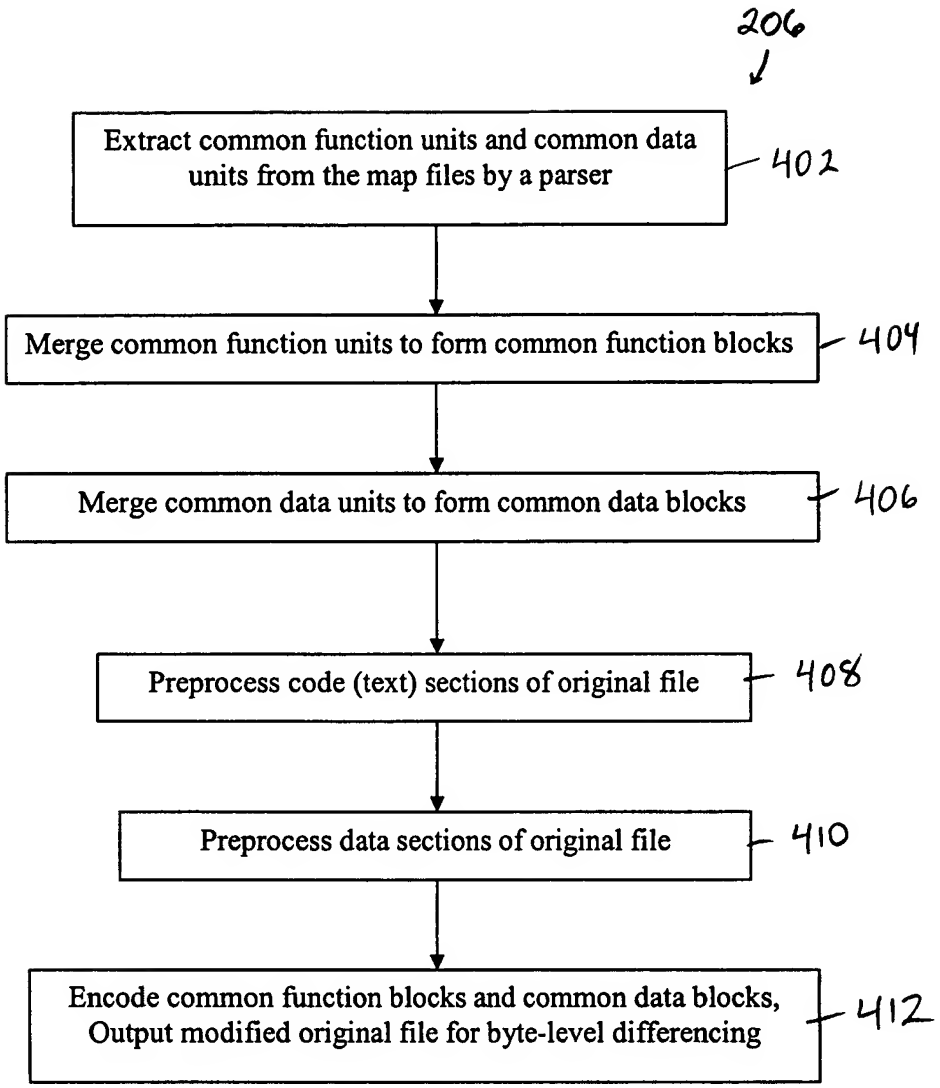
206
Extract common function units and common data units from the map files by a parser
402
Merge common function units to form common function blocks
404
Merge common data units to form common data blocks
406
Preprocess code (text) sections of original file
408
Preprocess data sections of original file
410
Encode common function blocks and common data blocks, Output modified original file for byte-level differencing
412

Figure 4

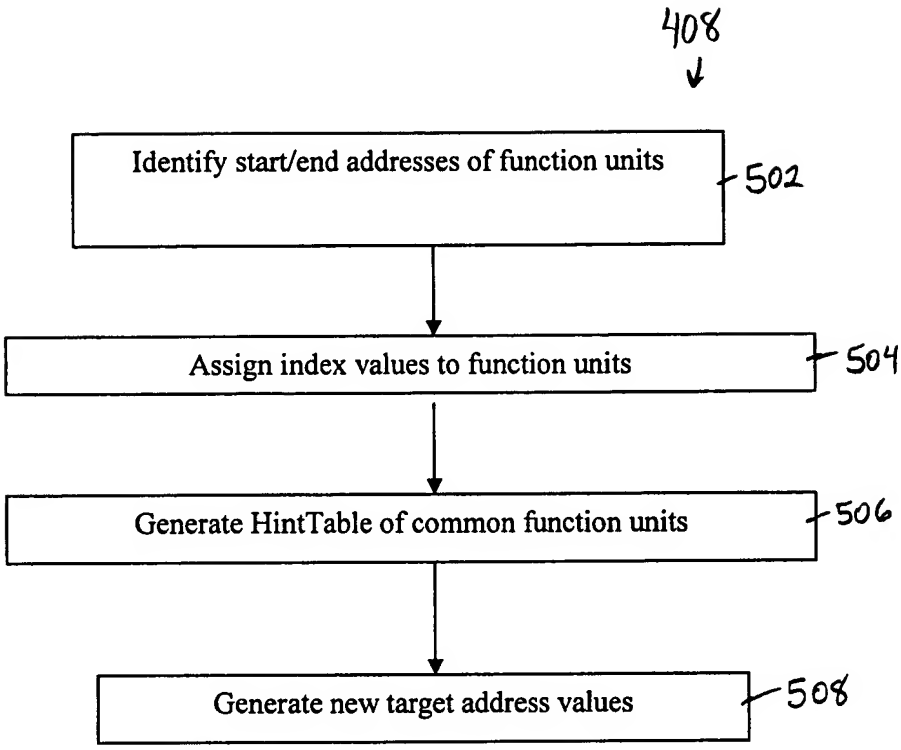
408
Identify start/end addresses of function units
502
Assign index values to function units
504
Generate HintTable of common function units
506
Generate new target address values
508

Figure 5

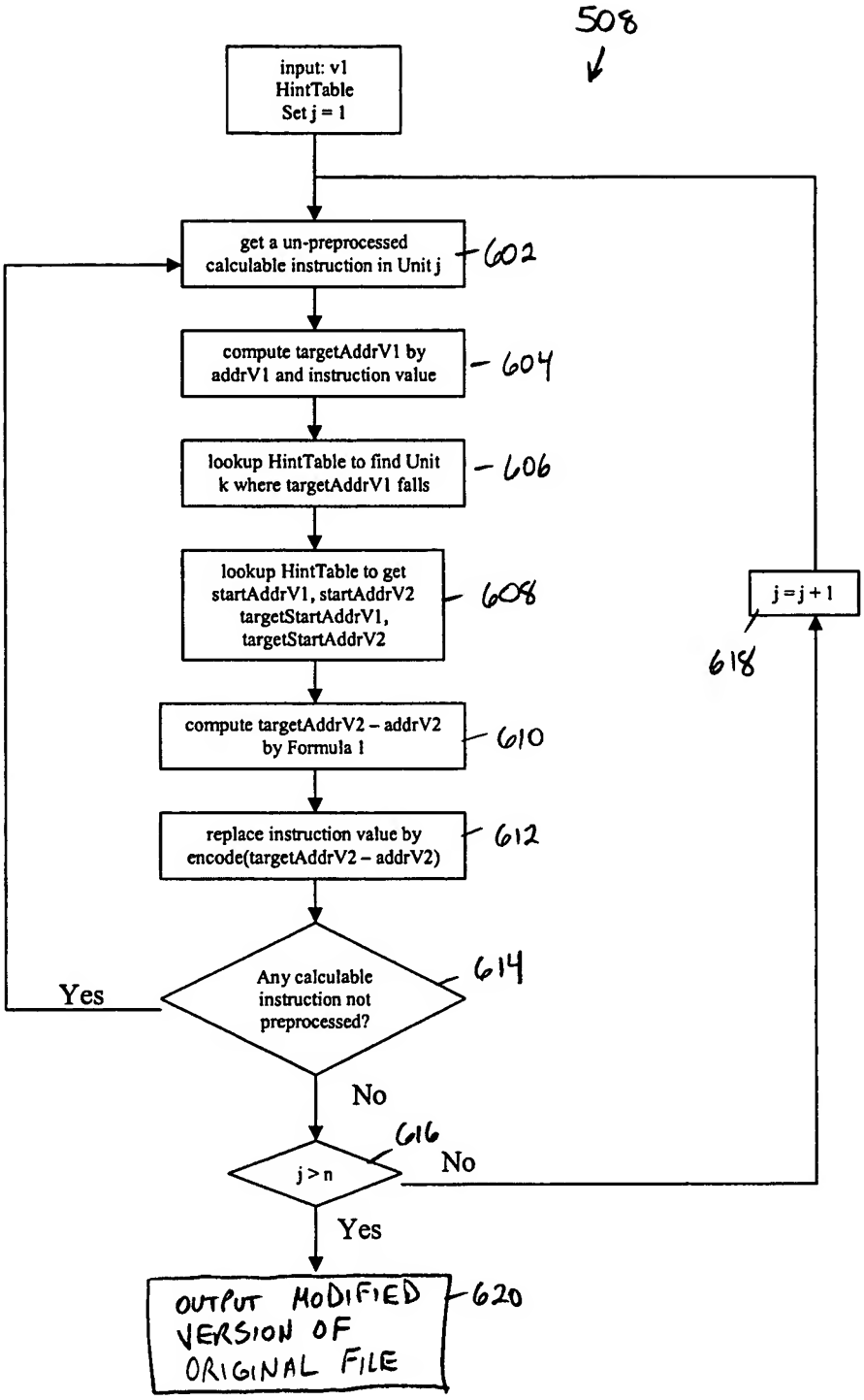
508
input: v1
HintTable
Set j = 1
get a un-preprocessed calculable instruction in Unit j
602
compute targetAddrV1 by addrV1 and instruction value
604
lookup HintTable to find Unit k where targetAddrV1 falls
606
lookup HintTable to get startAddrV1, startAddrV2 targetStartAddrV1, targetStartAddrV2
608
compute targetAddrV2 – addrV2 by Formula 1
610
replace instruction value by encode(targetAddrV2 – addrV2)
612
Any calculable instruction not preprocessed?
614
Yes
No
j > n
616
No
Yes
j = j + 1
618
OUTPUT MODIFIED VERSION OF ORIGINAL FILE
620

Figure 6

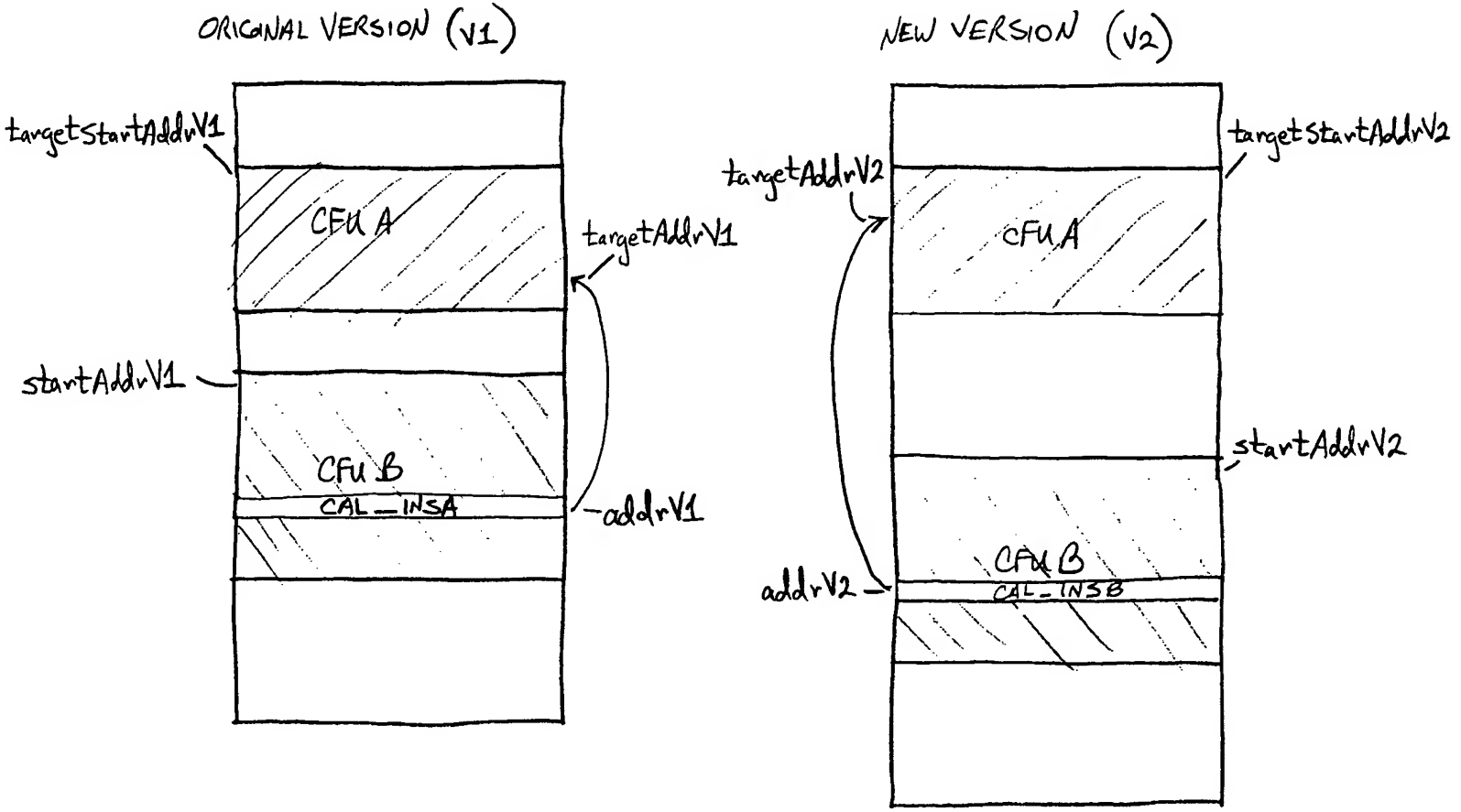
ORIGINAL VERSION (V1)
NEW VERSION (V2)
targetStartAddrV1
CFU A
targetAddrV1
startAddrV1
CFU B
CAL_INSA
addrV1
targetAddrV2
targetStartAddrV2
CFU A
startAddrV2
CFU B
addrV2
CAL_INSB

FIGURE 7

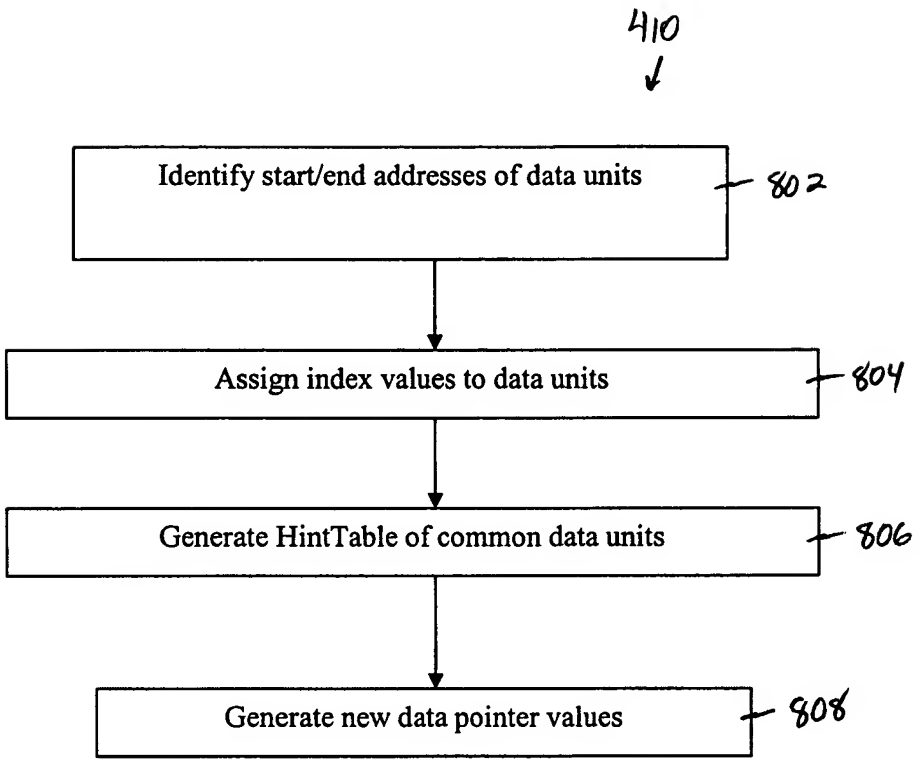
410
Identify start/end addresses of data units
802
Assign index values to data units
804
Generate HintTable of common data units
806
Generate new data pointer values
808

Figure 8

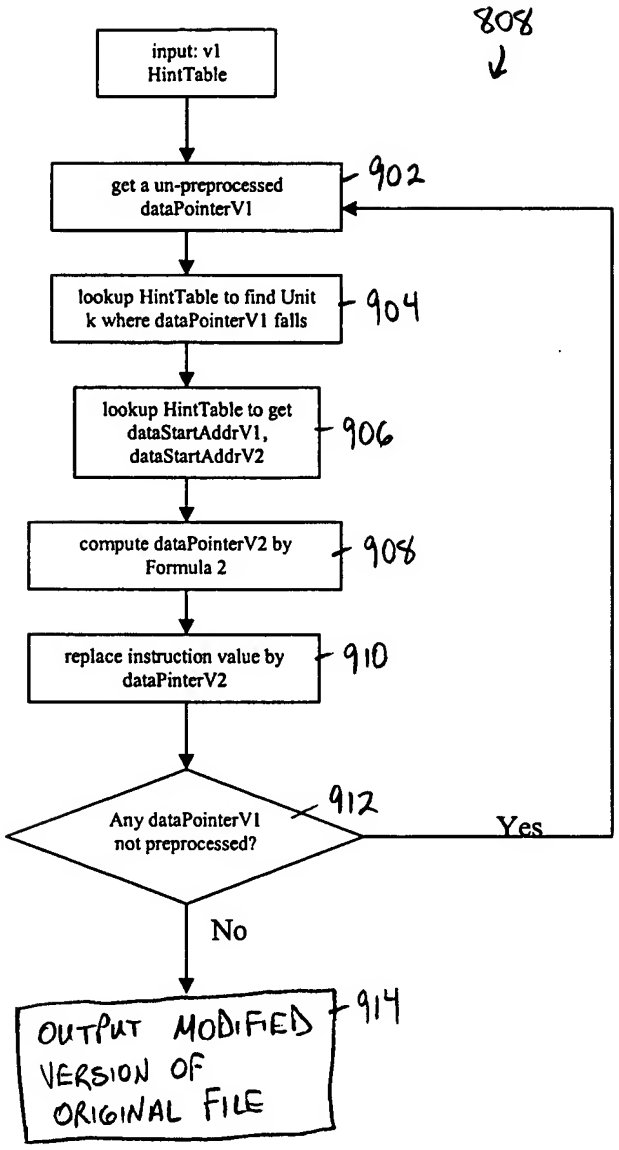
808
input: v1
HintTable
get a un-preprocessed dataPointerV1
902
lookup HintTable to find Unit k where dataPointerV1 falls
904
lookup HintTable to get dataStartAddrV1, dataStartAddrV2
906
compute dataPointerV2 by Formula 2
908
replace instruction value by dataPinterV2
910
Any dataPointerV1 not preprocessed?
912
Yes
No
OUTPUT MODIFIED VERSION OF ORIGINAL FILE
914

Figure 9

Original version (V1)

New Version (V2)

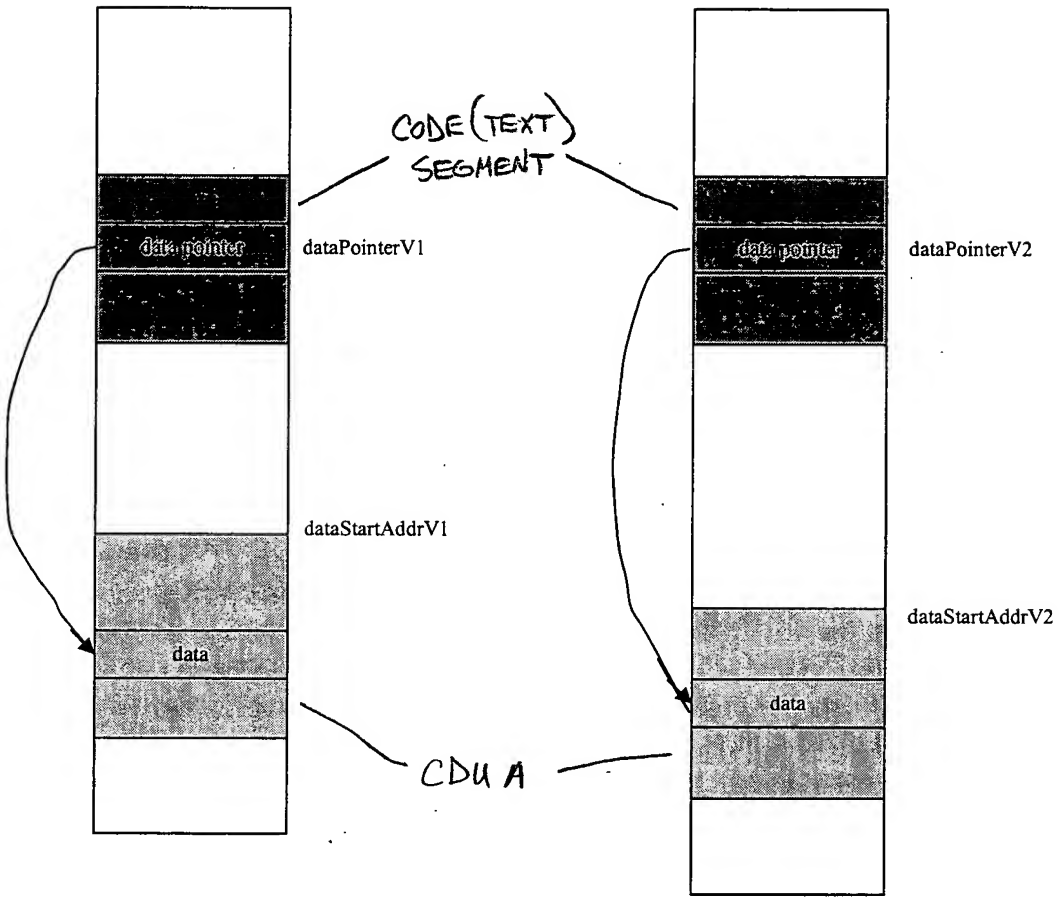

Figure 10

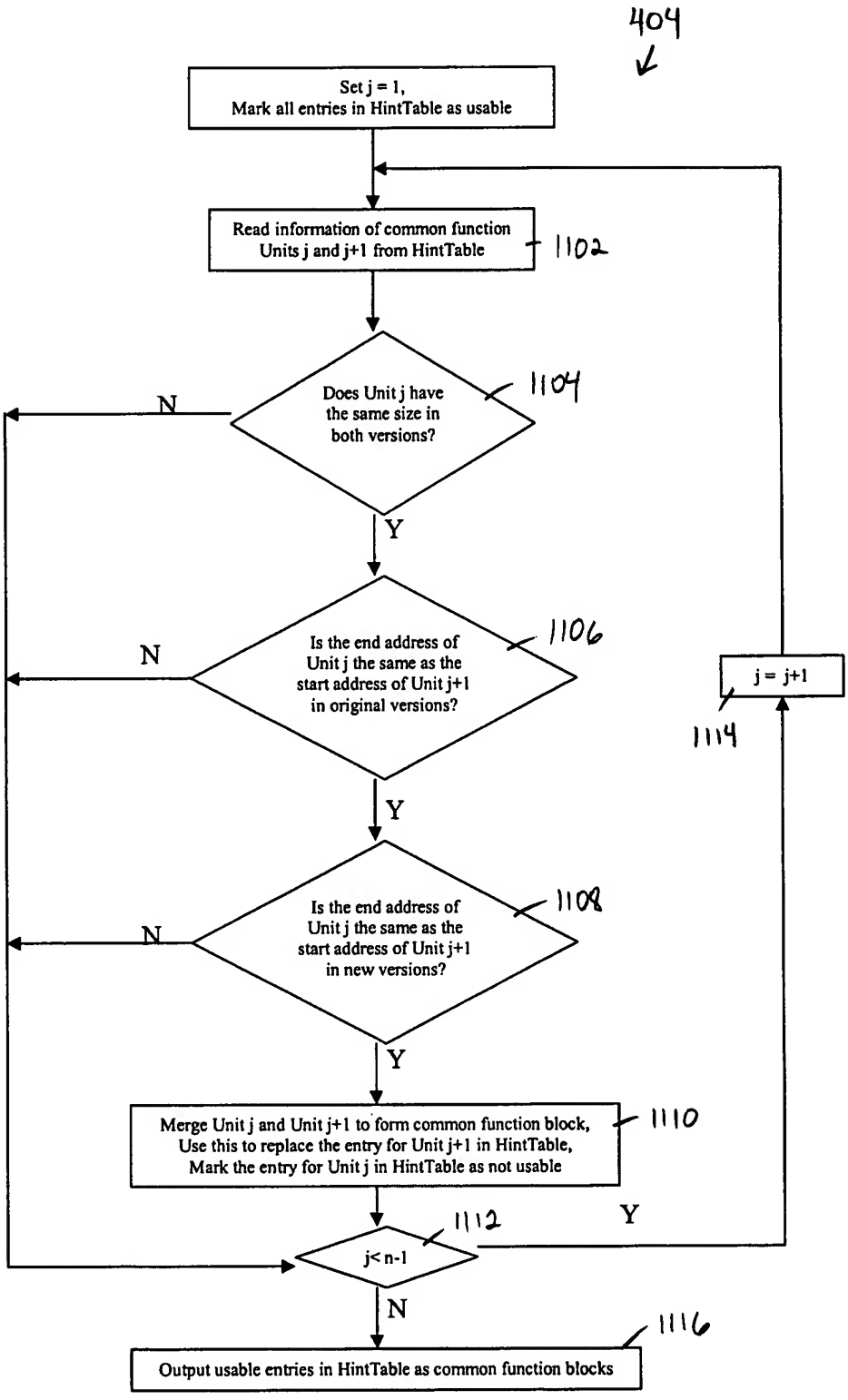
404
Set j = 1,
Mark all entries in HintTable as usable
Read information of common function Units j and j+1 from HintTable
1102
Does Unit j have the same size in both versions?
1104
N
Y
Is the end address of Unit j the same as the start address of Unit j+1 in original versions?
1106
N
Y
Is the end address of Unit j the same as the start address of Unit j+1 in new versions?
1108
N
Y
Merge Unit j and Unit j+1 to form common function block,
Use this to replace the entry for Unit j+1 in HintTable,
Mark the entry for Unit j in HintTable as not usable
1110
j< n-1
1112
Y
N
Output usable entries in HintTable as common function blocks
1116
j = j+1
1114

Figure 11

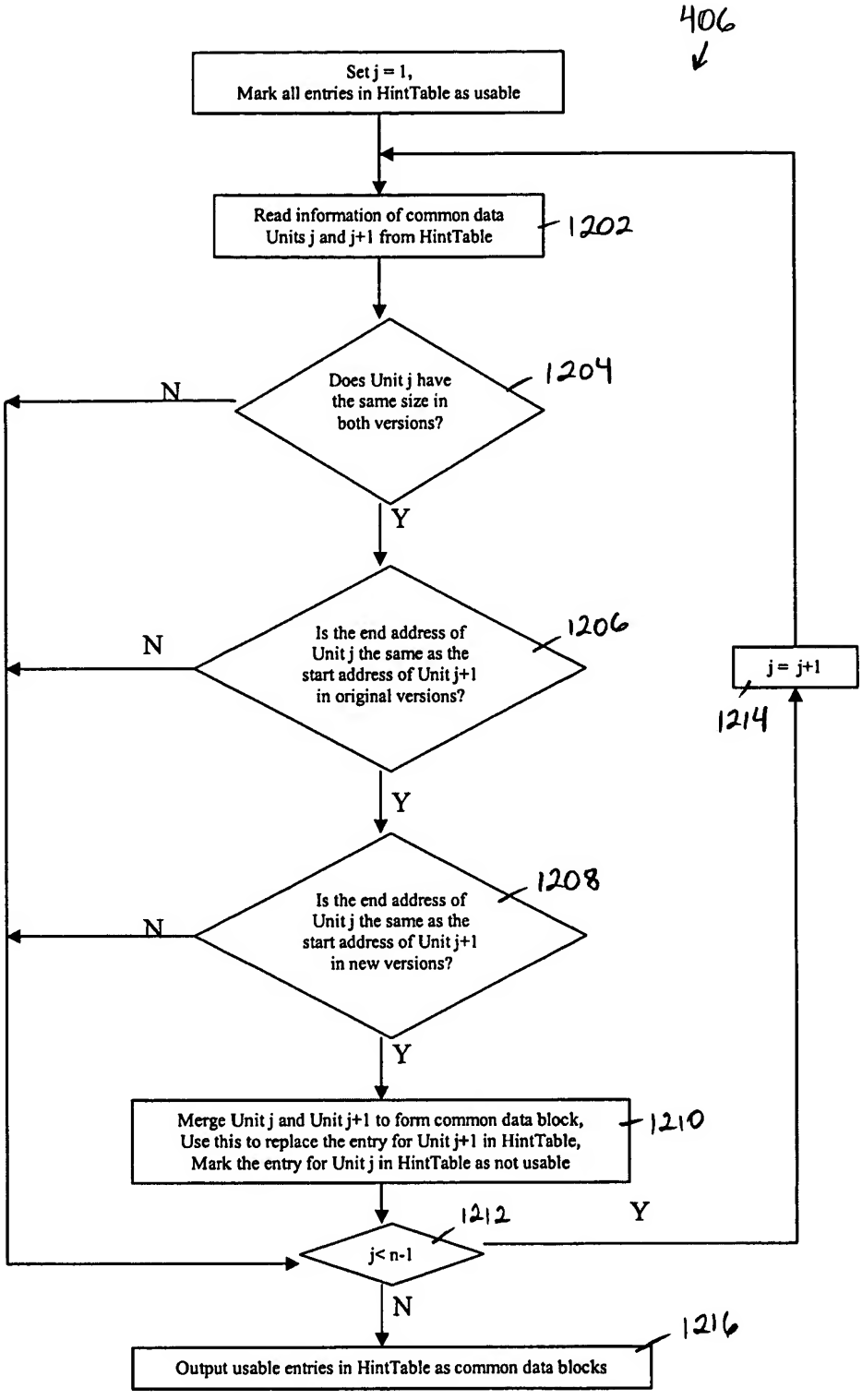
406
Set j = 1,
Mark all entries in HintTable as usable
Read information of common data Units j and j+1 from HintTable
1202
Does Unit j have the same size in both versions?
1204
N
Y
Is the end address of Unit j the same as the start address of Unit j+1 in original versions?
1206
N
Y
Is the end address of Unit j the same as the start address of Unit j+1 in new versions?
1208
N
Y
Merge Unit j and Unit j+1 to form common data block, Use this to replace the entry for Unit j+1 in HintTable, Mark the entry for Unit j in HintTable as not usable
1210
j< n-1
1212
Y
N
j = j+1
1214
Output usable entries in HintTable as common data blocks
1216

Figure 12